Exemption No. 7878

UNITED STATES OF AMERICA
DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION
RENTON, WASHINGTON 98055-4056

In the matter of the petition of **Embraer Empresa Brasileira de Aeronautica S.A.** for an exemption from § 25.785(b) of Title 14, Code of Federal Regulations	**Regulatory Docket No. FAA-2001-9337**

PARTIAL GRANT OF EXEMPTION

By letter dated July 12, 2002, Paulo C. Olenscki, Certification Manager, Embraer Empresa Brasileira de Aeronautica S.A., Av. Brigadeiro Faria, Lima 2170, 12227-901 – Sao Jose dos Campos SP, Brazil, petitioned the Federal Aviation Administration on behalf of Embraer Empresa Brasileira de Aeronautica S.A. for reconsideration of the operational limitation of Exemption No. 7811. Exemption No. 7811 is a partial grant of exemption from § 25.785(b) of Title 14 Code of Federal Regulations (14 CFR) which permits relief from the general occupant protection requirements for multiple-place side-facing seats on Embraer Model EMB-135BJ airplanes.

Sections of the Federal Aviation Regulations (FAR) Affected

Section 25.785(b), Amendment 25-64, requires general occupant protection for occupants of multiple-place side-facing seats that are occupied during takeoff and landing.

Petitioner's Supportive Information

The petitioner’s supportive information for their petition to remove the operating limitation from Exemption 7811 is summarized as follows:

On June 14, 2002, the FAA issued a partial grant of exemption (Exemption 7811, Docket Number FAA-2001-9337) that exempted Embraer from compliance with the general

occupant protection requirements of 14 CFR § 25.785(b) for the multiple-place, side-facing divan installed in the Embraer EMB-135BJ. As part of the partial grant, the FAA required compliance to be shown to the criteria for side-facing seats established by FAA draft issue paper "Dynamic Test Requirements for Side-Facing Divans (Sofas)," dated November 12, 1997, with some criteria changes as explained in the FAA Analysis section of the partial grant of exemption.

In addition to the technical criteria that the partial grant of exemption stipulated, there is a limitation on the operational use of any EMB-135BJ that utilizes the provisions of the partial grant of exemption for certification. Paragraph 1. of the partial grant of exemption stated:

> "The airplane must not be operated for hire, or offered for common carriage. This provision does not preclude the operator from receiving remuneration to the extent consistent with 14 CFR part 125, 14 CFR part 91, and subpart F, as applicable."

Embraer believes that the FAA's intent with this limitation is to preclude operation of the EMB-135BJ in an on-demand, charter operation per 14 CFR part 135 if the design is certified using the provisions of the partial grant of exemption.

Previously Granted Exemptions

Embraer has reviewed exemptions granted by the FAA to other aircraft manufacturers and cabin interior completion centers that installed side-facing divans in models that include FAR 25, Amendment 25-64 in their certification basis. We note that exemptions for the following models did not include this operational limitation, including some models that are direct competitors to the EMB-135BJ:

Applicant	Airplane Model	Docket Number	Exemption Number
Bombardier Completion Centre, Inc.	Model BD700-1A10 Global Express	29820	7120
Dassault Aviation	Falcon 2000	29583	7104
Cessna Aircraft Company	Cessna 680 Sovereign	2001-9982	7625

Competitive Impact

A divan type seating system is an important part of a business jet with the size and range of the EMB-135BJ. Most aircraft with this operational capability provide passengers with sleeping options more comfortable than a reclined seat, like our divan that can be folded into a flat bed. To limit the interior seating options to upright seats that can be reclined

will have a significant impact on the utility of the aircraft and its appeal to the business jet customer.

Embraer projects a ten-year production of EMB-135BJs of 240 airplanes, with sixty percent of those airplanes having corporate interiors with side-facing divans. Of this fleet of 144 aircraft, approximately fifty percent would be used, at least some of the time, as on-demand commercial charters. If all of those potential corporate-interior charter operators choose a competing product rather than accepting an interior without the divan in order to escape the operational limitation, the impact of the FAA's limitation would be approximately $1.5 billion dollars of lost sales (in current year dollars) over ten years.

Public Interest

Embraer believes that it is not in the public interest to arbitrarily isolate a particular model or manufacturer from a significant segment of the sales market through operating limitations that are imposed inconsistently. Eliminating models from the business jet charter market by arbitrarily imposed operational limitations serves to artificially limit competition in that market, with the associated effect on cost to the purchaser.

It is also not in the public's interest to prevent an airplane whose seats and interiors have been certified to the more stringent dynamic seat standards of Amendment 25-64 from operating in the on-demand charter market. Even though the EMB-135BJ has received an exemption from 14 CFR §25.785(b), its interior, due to its Amendment 25-64 certification basis, still provides a significant improvement in overall level of cabin safety compared to competing models whose interiors were certificated to earlier criteria.

Notice and Public Procedure Provided

By supplementary letter dated August 19, 2002, Embraer Empresa Brasileira de Aeronautica requested that a decision on their request for reconsideration of Exemption 7811 not be delayed by publication in the Federal Register and a public comment period. In accordance with 14 CFR 11.87, the FAA finds that action on this petition need not be delayed by Federal Register publication and comment procedures for the following reasons: (1) the notice and opportunity for prior public comment are impracticable because thoses procedures would significantly delay issuance of the design approval and delivery of the affected airplanes, and (2) issuance of the exemption would not set a precedent.

FAA’s Analysis of the Petition

Exemption No. 7811 was granted to Embraer Empresa Brasileira de Aeronautica with a limitation that restricted the airplane from being operated for hire or offered for common carriage. This exemption was granted without a time limitation.

The petitioner indicated that some exemptions were granted to other petitioners that did not include this operational limitation. This is correct. However, those exemptions and all other exemptions granted from § 25.785(b) for multiple-place side-facing divans (except the exemption granted previously to the petitioner) have been granted with a time limitation of January 1, 2004.

The FAA finds that it is in the public interest to grant time-limited exemptions without an operating limitation while the FAA conducts research to develop standardized criteria for all aircraft exempted from `§ 25.785(b). However, the FAA finds that it is not in the public interest to grant permanent exemptions that include non-private use operation. Such operators generally have a duty to provide service with the highest possible degree of safety in the public interest. Therefore, it is in the public interest to not grant relief for airplanes in non-private use operation once criteria for compliance with § 25.785(b) is established. This determination is consistent with all previously granted exemptions from § 25.785(b) for multiple-place side-facing seats.

The FAA will grant an exemption that will cover only airplanes that are manufactured for a specific amount of time. During this time, the FAA may refine the compliance criteria for multiple-occupancy side-facing seating. For the purposes of this exemption, the "date of manufacture" is the date on which inspection records show that an airplane is in a condition for safe flight. This is not necessarily the date on which the airplane is in conformity with the approved type design, or the date on which a certificate of airworthiness is issued. It could be earlier, but would be no later, than the date on which the first flight of the airplane occurs.

Exemption No. 7811 is not superseded by this exemption. It must be noted, however, that operation under either exemption (7811 or 7878) is exclusive of the other for the puposes of certification. Exemption No. 7811 is applicable to private use airplanes and does not have a time limitation. Exemption No. 7878 is applicable to airplanes which may be operated for hire or offered for common carriage and does have a time limitation. An airplane to which these exemptions is applicable may use either Exemption No. 7811 or Exemption No. 7878 for certification, but not both.

The Partial Grant of Exemption

In consideration of the foregoing, I find that a partial grant of exemption is in the public interest and will not affect the level of safety provided by the regulations. Therefore, pursuant to the authority contained in 49 U.S.C. §§ 40113 and 44701, delegated to me by the Administrator, Embraer Empresa Brasileira de Aeronautica is hereby granted a partial exemption from the requirements of 14 CFR 25.785(b) for general occupant protection for occupants of multiple-place side-facing seats that are occupied during takeoff and landing in Embraer EMB 135BJ airplanes manufactured prior to January 1, 2004.

The following limitations apply to this exemption:

1. Existing Criteria: All injury protection criteria of § 25.562(c)(1) through (c)(6) apply to the occupants of side-facing seating. The head injury criteria (HIC) assessments are only required for head contact with the seat and/or adjacent structures.

2. Body-to-Body Contact: Contact between the head, pelvis, or shoulder area of one Anthropomorphic Test Dummy (ATD) and the adjacent seated ATDs is not allowed during the test conducted in accordance with § 25.562(b)(1) and (b)(2). Incidental contact of the legs, feet, arms and hands that will not result in incapacitation of the occupants is acceptable. Any contact between adjacent ATDs is acceptable during rebound.

3. Body-to-Wall/Furnishing Contact: If the side-facing divan is installed aft of a structure such as an interior wall or furnishing that may contact the pelvis, upper arm, chest, or head of an occupant seated next to the structure, then a conservative representation of the structure and its stiffness must be included in the tests. In most cases, the representation of the structure would be more rigid and have less deflection under load than the actual installation on the airplanes. The contact surface of this structure must be covered with at least 2 inches of energy absorbing protective foam, such as ensolite. However, if the test was conducted without the 2-inch padding and met all of the requirements of the thoracic trauma index (TTI), lateral pelvic acceleration, and head injury criteria (HIC), and the applicant demonstrated that the contact surface was homogeneous, the 2-inch padding requirement for contact surfaces installed forward of side-facing seat could be eliminated.

4. Thoracic Trauma: Thoracic trauma index (TTI) injury criteria must be less than 85, as defined in 49 CFR part 572, subpart F. TTI data must be processed as defined in Federal Motor Vehicle Safety Standard (FMVSS) part 571.214, section S6.13.5. Should occupant torso contact exist, TTI must be substantiated by dynamic test or rationale based upon previous testing of a similar design/installation. If it can be shown from known occupant movement data that an occupant's torso will not be contacted up to the maximum test load, a TTI measurement is not required based on this absence of torso contact. Torso contact during rebound is acceptable and need not be measured.

5. Pelvis: Lateral pelvic acceleration for all side-facing occupants must be substantiated if there is pelvic contact during testing. Should occupant pelvic contact exist, lateral pelvic acceleration must be substantiated by dynamic test or rationale based on previous dynamic testing of a similar design/installation. When conducting an actual test to obtain a lateral pelvic acceleration value, an appropriate test device capable of recording such a value should be used. Pelvic acceleration data must be processed as defined in Federal Motor Vehicle Safety Standard (FMVSS) Part 571.214, Section S6.13.5. Pelvic lateral acceleration must not exceed 130g. Pelvic acceleration data must be processed as defined in FMVSS part 571.214, section S6.13.5.

6. Shoulder Strap Loads: Where upper torso straps (shoulder straps) are used for side-facing divan occupants, tension loads in individual straps must not exceed 1,750 pounds. If dual straps are used for restraining the upper torso, the total strap tension loads must not exceed 2,000 pounds.

7. Seat Positions: All seat positions need to be occupied by ATDs for the longitudinal tests.

8. Occupant Retention: All side-facing divans require end closures or other means to prevent the occupant from moving laterally off the end seat.

9. Longitudinal Tests: For the longitudinal tests conducted in accordance with the conditions specified in § 25.562(b)(2), a minimum number of tests will be required as follows:

a. One test will be required with ATDs in all positions, with undeformed floor, with all lateral supports (armrests/walls), and with zero or 10 degrees of yaw induced to yield critical occupant contact with the component(s) being evaluated for occupant protection. For configurations with a wall or bulkhead immediately forward of the forward seat position on the sofa, a Side Impact Dummy (SID) or equivalent ATD will be used in the forward seat position and a Hybrid II ATD(s) or equivalent will be used for all other seat locations. For configurations without a wall or bulkhead immediately forward of the forward seat, Hybrid II ATDs or equivalent will be used in all seat locations.

b. One test will be required with Hybrid II ATDs or equivalent in all positions, with deformed floor, 10 degrees yaw, and with all lateral supports (armrests/walls). This could be considered the structural test as well.

10. Vertical Test: One test will be required conducted in accordance with the conditions specified in § 25.562(b)(1). Hybrid II ATDs or equivalent will be used in all seat positions.

Issued in Renton Washington, on September 9, 2002.

/s/Ali Bahrami

Ali Bahrami
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